

Grand Forks Air Force Base, North Dakota
Recycling, Non-Industrial Installation Category

Introduction

Grand Forks Air Force Base is proud its more than \$2 million savings due to recycling achievements in fiscal years 1998-99. Our efforts to protect the environment and conserve natural resources began early in the base's history and have evolved into a mature environmental protection program. Recycling, rather than traditional solid waste disposal, is essential element to this effort.

During FY98-99, these efforts helped the base exceed two Department of Defense Measures of Merit.

■ **More than 60 percent reduction.** Grand Forks reduced solid waste disposed to a landfill by 60.6 percent, exceeding the DoD 50 percent reduction Measure of Merit in the amount of solid waste landfilled, two years ahead of schedule. In 1992, the baseline year for determining the Measure of Merit, Grand Forks AFB landfilled 7,660 tons of solid waste. By 1998, we met this goal, and by 1999 we sent 3,018 tons to the landfill while eliminating 4,642 tons from the waste stream and recycling 1,470 tons of solid waste.

■ **Waste Stream Diversion.** Grand Forks now diverts almost 44.4 percent of its waste streams into recycling efforts, exceeding the new CY05 DoD Measure of Merit an amazing six years ahead of schedule. Currently, the base generates 6,300 tons of solid waste per year, but 2,800 tons of it is diverted from landfill disposal.

Grand Forks AFB's people established an environmental management program that continues to pave the way to excellence. By developing innovative pollution prevention programs, Grand Forks AFB has taken a proactive rather than reactive management style. We eliminate pollution at the source, rather than manage it at the end of the pipe. This has allowed us to remain "Enforcement Action-Free," for more than 10 years, while exceeding the Air Force waste diversion goal the very first year it was put in place.

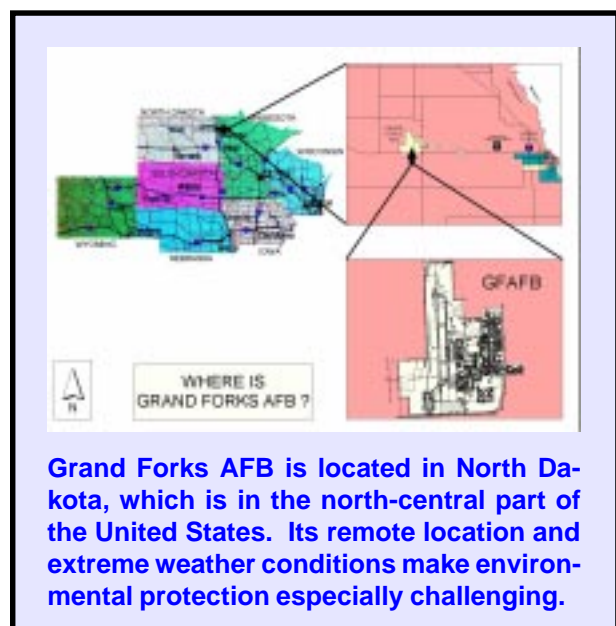
Grand Forks AFB's program has been widely recognized, receiving 24 federal, state, DoD and Air Force awards, including the White House Closing the Circle Award, since 1993. This program won the 1999 Air Force General Thomas D. White Environmental Recycling Award, and won AMC's Pollution Prevention and Recycling Awards five of the past six years!

The following describes the base's mission and facilities and the highly effective programs and actions implemented here to optimally reduce and recycle the solid waste generation.

Location & Population

In 1954, the Department of Defense chose Grand Forks as the site for a new Air Force base. The base now occupies 4,830 acres of land, and its facility infrastructure includes more than 315 acres of airfield surfaces, 96 miles of roads, four government-owned wastewater treatment lagoons, a permitted contaminated soil land farm, 11 aircraft maintenance hangars, more than 100 fuel storage tanks with 4.5 million gallon capacity, and 1,147 other buildings and facilities occupying more than 6.5 million square feet of floor space. The base supports approximately 7,000 airmen and their families, DoD employees and a large number of contractors. The base also serves nearly 2,700 military retirees and their families.

Grand Forks AFB is located near the North Dakota-Minnesota border close to the junction of the Red Lake River and the Red River of the North. The area is sparsely popu-



Grand Forks AFB is located in North Dakota, which is in the north-central part of the United States. Its remote location and extreme weather conditions make environmental protection especially challenging.

lated with a population density of only about nine people per square mile. This density can be compared to an east coast region of similar size (Virginia, Maryland, West Virginia, and the District of Columbia combined), which has a population density of 181 people per square mile.

Grand Forks AFB is adjacent to the Kelly's Slough National Wildlife Refuge. The base, local and state authorities are jointly responsible for this valuable resource's protection. Base activities are not allowed to impact the refuge. A major base fuel line runs near the refuge, and Grand Forks AFB leads the local emergency planning committee responsible for responding to any environmental situations involving it.

Mission

Grand Forks AFB plays a central role in our nation's defense. As Air Mobility Command's first super tanker wing, the 319th Air Refueling Wing guarantees global engagement by providing air refueling support for U.S. and allied aircraft, people and cargo transport where and when needed by America. As one of three super tanker wings, it's a vital element of America's air mobility and nuclear deterrence teams.

During the past year, wing members have supported operations, like last spring's Operational Allied Force, from bases in England, France, Italy, Turkey and the Arabian Gulf region, as well as counter-drug operations in Panama.



Forty-eight KC-135R Stratotankers are assigned to the 319th Air Refueling Wing's four flying squadrons.

At home, the base provides logistical and infrastructure support, training facilities, and housing to support its flying mission. The base manages 2,271 military family housing units; 861 dormitory rooms; provides all maintenance, fire and police protection and other community services; and administers its own school district within the Grand Forks city school system, with an enrollment of more than 1,100 students.

Background

The base's air refueling mission requires a major infrastructure, which in turn generates a tremendous amount of industrial waste. Generated waste includes:

- Used petroleum products, lubricants, oil and paint booth filters, solvents, paint overspray, batteries, wastewater, hazardous wastes and other industrial wastes.
- Construction debris.
- Paper, plastics, fluorescent light tubes and inkjet/laser toner cartridges.
- Food waste, glass, metal cans, paper, cardboard, wood and plastic.
- Waste fluids, paint, solvents, adhesives, pesticides and lawn clippings.
- Spent antifreeze, oils, lubricants, fuels, paint, solvent, and batteries.
- Household solid and hazardous waste, used furniture and appliances, lawn and garden debris.

Grand Forks AFB's location provides another challenge - its remote location means recyclable materials are routinely shipped more than a thousand miles in order to reach suitable markets such as St. Louis, Chicago or elsewhere. The region's sparse population supports only limited recycling opportunities. For instance, there are no modern solid waste facilities nearby equipped with high-speed recycling equipment to separate recyclables from trash. Waste separation must occur at the origination point for our program to be successful. The long, severely cold winters make even routine operations, like recycling, difficult.

Organization, Staffing & Management

Grand Forks AFB has become a preeminent environmental leader in the Air Force by embracing environmental security as an integral part of the mission. The 319th Air Refueling Wing commander heartily supports the base environmental program through personal leadership and base operating instructions. He ensures compliance through the Environmental Protection Committee, which ensures the base's resources are effectively used and managed to satisfy our primary mission, while preventing pollution and complying with a broad range of federal, state and local environmental laws and regulations. The wing's vice commander leads the EPC, providing vision, and direction while continuing to monitor progress toward environmental goals.

Environmental Protection Committee Membership

EPC voting members include all group and tenant organization commanders. A cross-functional team of technical advisors supports the EPC, including environmental, industrial health and hygiene, safety, legal, public affairs, contracting and finance experts.

Environmental Protection Committee Priorities

EPC priorities are implemented via 32 squadron environmental representatives, who monitor their pollution reduction responsibilities and disseminate information throughout their units. The representatives were educated through a train-the-trainer program, armed with an informative pollution reduction and education slide program and provided with technical support tools. They are an integral part of the team, facilitating recycling and other environmental programs, and providing feedback to improve the iterative process.

Environmental Protection Committee Successes

Representatives' creative ideas support program. One representative identified the need for an environmentally safer product for technicians to use in performing aircraft maintenance. He gleaned information from the Defense Logistics Agency's *Environmental Products Guide* to substitute PD-680 Type II, a hazardous solvent, with a safer aqueous-based solvent to clean aircraft landing gear. The change cut the process waste stream by 1,000 pounds per year, eliminated hazardous exposure to personnel; and was adopted as the wing standard.

Environmental Management

The 319th Civil Engineer Squadron Environmental Flight manages the base's environmental program. The flight's responsibilities include:

- ◆ Environmental Planning
- ◆ Programming & Budgeting to Capture Resources
- ◆ Pollution Prevention
- ◆ Natural/Cultural Resource Management
- ◆ Soil & Water Conservation
- ◆ Protection of Threatened & Endangered Species
- ◆ Hazardous Waste & Spill Response Management
- ◆ Potable Water & Wastewater Monitoring
- ◆ Solid Waste Reduction & Recycling
- ◆ Environmental Impact Analysis Process
- ◆ Archaeological & Historical Resource Management

Environmental management flight metrics track progress, identify innovative leaders and ideas and wipe out inefficiencies. Several units directly support environmental programs through their daily activities. They are:

319th Aeromedical Operations Squadron Bioenvironmental Engineering Flight

Flight members assess the industrial health risks of hazardous material uses, assign risk assessment codes to hazardous processes that raise flags for intervention and outline engineering controls or personal protective equipment to safeguard people and the environment. They also recommend product substitutions that replace hazardous chemicals with environmentally friendly ones.

319th Air Refueling Wing Ground Safety Office

Staff members evaluate industrial and household processes to ensure compliance with occupational safety and environmental protection requirements and assign risk assessment codes to hazardous processes that provide targets of opportunity for the environmental program.

319th Supply Squadron

Unit members operate the Hazardous Materials Pharmacy, a one-stop shopping center for hazardous materials on base that also accepts unwanted hazardous materials for reuse or recycling. Supply personnel also ensure the affirmative procurement of recycled-content goods to help close the recycling loop.

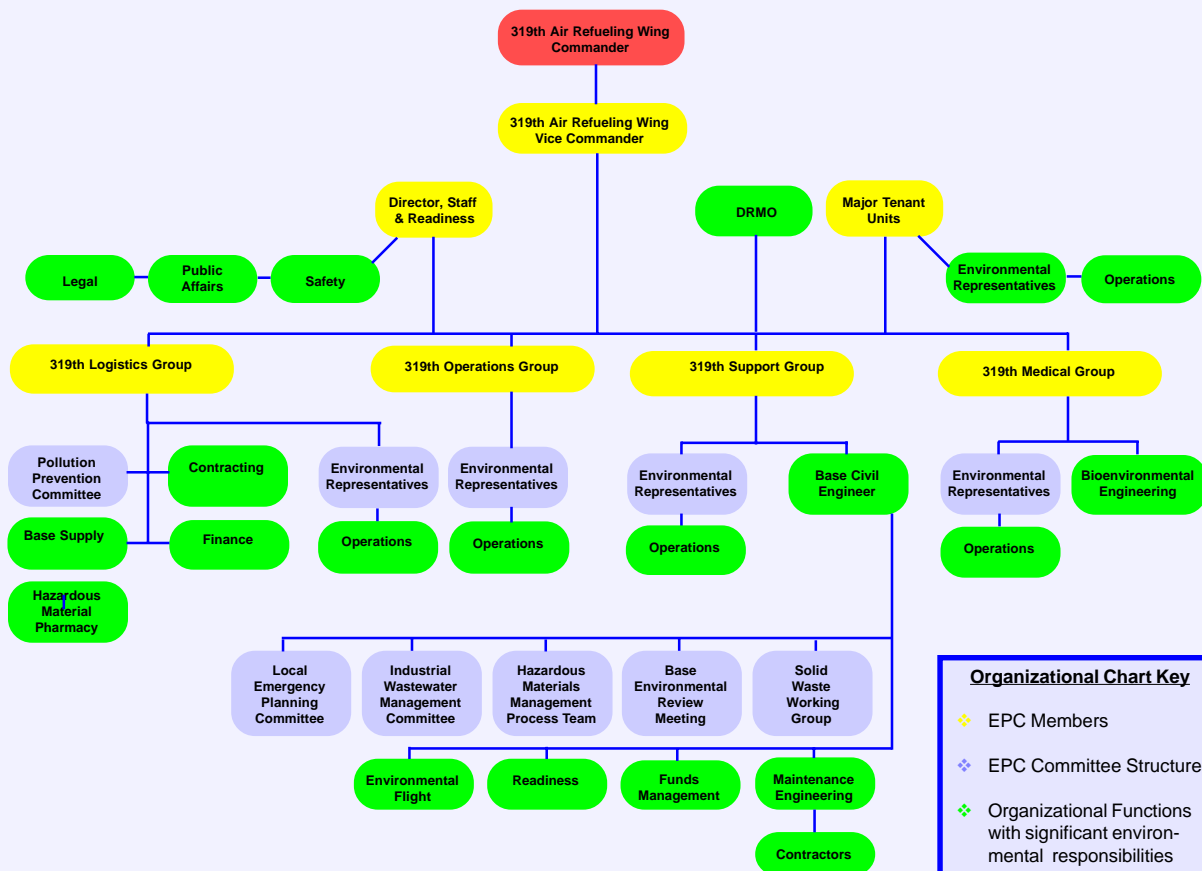
319th CES Maintenance Engineering Flight

Flight members manage the base-wide integrated solid waste and recycling contract and oversee chemical usage by various service providers, like the grounds maintenance contractor. In one case, a contract quality assurance evaluator uncovered fraud committed by the former used oil recycling contractor. The QAE notified state regulators and Air Force criminal investigators, who launched criminal proceedings against the violator. This action avoided an unpermitted environmental discharge violation and saved the Air Force \$20,000.

The Defense Reutilization & Marketing Office

This organization accepts furniture, industrial equipment, clothing, scrap metal, lead-acid batteries and other materials for its Reuse, Transfer Donate or Sell Program. In FY98-99, the Grand Forks AFB Defense Reutilization & Marketing Office sold more than 684 tons of recyclables - about 30,000 items - for \$400,000.

Grand Forks AFB Environmental Management Organization



Partners & Public Involvement

Grand Forks AFB's partnering and public involvement programs emphasize cooperation with other organizations and community education and outreach. Base representatives are involved in numerous local, state, national and DoD working groups and committees that promote environmental protection, solid waste reduction and recycling. Two-way education and outreach efforts increase awareness in the importance of waste reduction and recycling at Grand Forks AFB, which is key to program success. These efforts are accomplished through briefings, presentations, publications, the base intranet site and participation in public events.

Working Groups & Committees

State & Military Environmental Issues Working Group

Base and North Dakota Department of Health officials have established a unique partnership that is dedicated to improving environmental compliance, waste reduction and recycling. Regular meetings between both agencies keep each abreast of ongoing progress and issues.

Industrial Wastewater Management Committee

The Industrial Wastewater Management Committee addresses base wastewater issues. Grand Forks AFB operates its own sewage treatment works within strict permit requirements. The team conducted a \$3.1 million repair project to cut infiltration and inflow into the base sewer system. The sewer system was suffering 3-4 overflows per year due to excess infiltration and inflow. A special camera team was used to find leaks and cracks. Repairs were made to alleviate the excess infiltration and inflow water that caused the system failure. The team also evaluates base hazardous chemical use to ensure compliance with its wastewater discharge permit.

RCRA Corrective Action Meetings

The base Resource Conservation and Recovery Act Corrective Action permit allows it to clean up contaminated hazardous waste sites. The permit requires monthly updates with state regulators; however, our program managers meet at least weekly or whenever necessary to avoid problems. The base solid waste landfill and contaminated soil land farm are included in this permit.

AF Contingency High Priority Mission Support Kit Task Force

Grand Forks AFB logistics members worked with Air Mobility Command and Air Staff to create a first-of-its-kind supply resource for overseas theater deployment. Grand Forks members minimized the type and amount of hazardous material contained in the on-board kit.

Base Environmental Review Meeting

The Base Environmental Review Meeting is chaired by the base civil engineer. Its members include environmental management, bioenvironmental engineering, legal, public affairs, safety, contracting, supply and squadron environmental representatives. These monthly meetings keep the BCE abreast of environmental issues, and allow the exchange of vital information between members.

Solid Waste Reduction Working Group

This group of squadron environmental representatives, civil engineering environmental program managers, maintenance engineering flight contract quality assurance evaluators and the integrated solid waste and recycling contractor meets monthly to improve and promote solid waste reduction, recycling and pollution prevention opportunities. The meetings provide an opportunity to exchange information and identify issues requiring follow-up action.

Pollution Prevention Committee

This group, chaired by the 319th Logistics Group Commander, consists of base and tenant representatives. It meets at least quarterly to exchange information and act on pollution prevention and recycling initiatives at Grand Forks AFB.

Hazardous Materials Management Process Team

This cross-functional team meets monthly to discuss hazardous material authorization, tracking, reduction, product substitutions, recycling, waste avoidance, regulatory reporting, training and other related issues.

Environmental Representatives

Squadron representatives facilitate environmental programs at each work center. An entertaining recycling and pollution reduction slide presentation is provided to them to show at organizational gatherings and planning meetings. They are given educational resources and technical points of contact to solve problems with the processes they monitor.

Education & Outreach Efforts

Promotional Items. The environmental flight distributes promotional items that highlight base recycling program initiatives. These items include pens, pencils, rulers, shopping bags, coloring booklets and note pads made from recycled material. Each touts a recycling message. To date, we have distributed approximately 13,000 items to base school students, their parents, military members, civilian employees and family members.

First Term Airman Center Briefings. Newly assigned airmen receive two weeks of training at the FTAC that indoctrinates them regarding base operations and programs. These airmen receive comprehensive training regarding base recycling efforts and their responsibilities in the program. Emphasis is placed on ways for individuals to maintain compliance (e.g., deposit used motor oils at the reuse center).

Environmental Web Site. The base uses an intranet web site to promote its environmental programs. The site stresses compliance, waste reduction, reuse and recycling issues. It's available to all shop and office members at <http://w3/Geninfo/319CES/CEV.htm>.

Military Family Housing Educational Materials & Briefings. Military families living in the base's housing areas receive an occupant waste and recycling briefing. These responsibilities are also spelled out in Grand Forks AFB Pamphlet 90-5, *Family Housing Brochure*. In addition, all occupants receive a magnetized placard with recycling information for the home.

Earth Week. We have extended the traditional Earth Day into a week-long celebration. This year, during Earth Week, the Youth Center became an environmental fairground. A parade, led by the base commander, kicked off the event. Attractions included licensed



Promotional items are distributed by the environmental flight staff and volunteers throughout the base.



Environmental articles regularly run in the base newspaper, "The Leader."

animal handlers with several endangered species, state and local environmental commission representatives, craft-making using recycled materials and recycling theme games. Other activities included environmental displays at the base library, base exchange and commissary. Environmental awareness videos were shown on the base's closed circuit cable TV channel. A scout troop and 4-H poster contest was also held at the base exchange. Winners received prizes made from recycled materials. An Earth Day luncheon was held at the Officers' Club with an Air Mobility Command guest speaker. Lastly, a recycled-material statue-sculpting contest was held in the dormitory area.

Publications. Recycling and waste reduction articles regularly appear in the base newspaper, *The Leader*. Past articles highlighted family housing recycling, solid waste reduction, composting and household hazardous material reuse programs.

Friends & Neighbors Day. More than just an open house, Friends and Neighbors Day embodies the close bond between the local community and Grand Forks AFB. More than 70,000 people attended this event in 1998, and were treated to a staffed recycling booth. The exhibition showcased the on-base recycling program with posters, newsletters and promotional items made from recycled materials.

Water Festival. The U.S. Army Corps of Engineers, with the State of North Dakota Department of Health and the City of Grand Forks Public Works Department, sponsored this event to raise city school children's awareness regarding the need for water conservation and environmental protection. In October 1998, the base participated by staffing a booth at the festival, and by distributing recycling promotional material. Base representatives explained why students should purchase recycled content goods, dispelled commonly held myths about recycled content products, and listed consumer products that are likely to have significant levels of recycled content.

America Recycles Day. The theme for last year's event was "If you're not buying recycled, then you're not recycling." This celebration highlighted base recycling activities through newspaper articles, public displays and information on the Commanders Access Cable TV channel.

Children's Christmas Party. The 319th Civil Engineer Squadron holds an annual Christmas party for family members. Activities include craft making with recycled materials and games with prizes made from recycled materials. Educational displays are set up to show the value of recycling and environmental protection.



To promote recycling awareness, about 4,000 recycling magnets were issued basewide.

Program Summary

Program Type & Size

To counteract mission and geographic challenges, base officials ordered a mandatory, base-wide recycling program covering all aspects of solid waste disposal. To maximize this effort more than 3,500 collection bins, boxes, cans and dumpsters were distributed to all housing occupants, placed in office buildings and industrial locations. Each housing unit is issued a 90-gallon, six-part recycling container and a magnetized informational placard for segregating recyclables at home. Use of clear plastic bags is encouraged to ensure recyclable material is not inadvertently thrown away. To further increase efficiency, the base let a single, integrated solid waste contract. The contractor collects residential, office, commercial, industrial, construction, demolition, yard, wood waste and recyclables. Solid waste is consolidated with waste from other local communities and managed, reused, composted, recycled and disposed of at specialized facilities off base.

During FY98-99, Grand Forks exceeded the DoD 50 percent waste reduction goal by disposing of 3,018 tons of solid waste — a 60.6 percent drop from our FY92 baseline. (In FY92, approximately 7,660 tons of solid waste was landfilled and 146 tons of material was recycled from base housing sources.) During FY99, the base increased its recycling level to 1,470 tons, a 10-fold increase from the baseline. Military family housing alone recycled 711 tons — a 487 percent increase. In FY99, Grand Forks diverted 2,800 tons, or 44.4 percent, of its waste stream into reuse and recycling activities.

In 1999, Grand Forks developed a base-wide Affirmative Procurement Plan to close the recycling loop. This plan implements Resource Conservation and Recovery Act, Executive Orders, DoD, and Air Force affirmative procurement requirements. It describes actions that agencies must use to ensure that specifications for procurement actions will bring about the increased use of recycled material. When agencies procure products using these specifications, products will be made wholly or in part from recycled materials. Base members ensure that affirmative procurement requirements are met base-wide.



Each base home is equipped with a large plastic recycling container for easy disposal and pickup of recycled goods on collection days.

"Grand Forks Air Force Base is recognized for their community's recycling excellence, using curbside, drop off, and source reduction to manage their waste stream."

**Neil M. Knatterud, Director
Division of Waste Management
N. D. Department of Health**

Program Goals & Objectives

At Grand Forks AFB, the phrase "Pollution Prevention" means more than simply recycling. We consider the waste source before products are even purchased to eliminate as much waste as possible. Grand Forks AFB's Pollution Prevention Management Action Plan uses the most cost-effective management approaches possible to reduce the quantity of solid and hazardous waste generated and to collect, process and market an increasing quantity of materials. We

follow the Environmental Protection Agency's four-tiered waste reduction process:

■ **Reduce waste at the source.** An example is the Hazardous Materials Pharmacy, or HAZMAT, which consolidates, orders and issues hazardous materials in minimum quantities to reduce the amount of hazardous chemicals used.

■ **Reuse materials - when feasible.** The collection and reissue of still useful products greatly reduces solid and hazardous waste generation. Success stories include the household chemical exchange at the Grand Forks AFB Self-Help store and aggressive product shelf-life management.

■ **Recycle.** An example is the 100 percent industrial and household waste-recycling program on base. Our affirmative procurement program closes the loop by governing the purchase of items to increase buying recycled-content materials (e.g., all of our office paper - about 400 tons a year - contains recycled materials).

■ **Responsible disposal.** Rigorously managing solid and hazardous waste disposal contracts ensures proper disposal of items that cannot be reused or recycled.



Contractors pickup recyclables during a recent pickup run in base housing.

Program Execution

Grand Forks AFB's program is executed through the Pollution Prevention Management Action Plan, which is based on a thorough analysis of the base's waste streams. It provides guidance on solid waste management, waste reduction, composting, recycling, regulatory and Air Force guidelines, solid waste education, and affirmative procurement policy. The plan also includes an analysis of waste reduction, composting and recycling options and the program requirements for meeting existing and future waste reduction goals. Continuing education and awareness programs help promote the management action plan.

Program Features & Accomplishments

The base has exceeded DoD Measures of Merit by implementing an integrated solid waste management and recycling plan along with other related efforts. Our dedication in recycling and managing waste streams avoids costly disposal. Significant accomplishments have been achieved during FY98-99 on all four of our program goals — resulting in \$2 million savings in labor, facilities and supplies, while increasing mission effectiveness. These successes include:

Source Reduction

Landfill Use Down More than 60 percent! In an extraordinary achievement, Grand Forks AFB's waste reduction program exceeded the DoD Measure of Merit goal two years ahead of schedule. In FY92, approximately 7,660 tons of solid waste was landfilled, but in FY99 only 3,018 tons of solid waste were landfilled. This is a 60.6-percent reduction!

Effectively implementing the base's Pollution Prevention program helped us to identify, track and optimize waste reduction. As a result, the base has:

- Eliminated 75 waste streams and saved approximately 400 man-hours a year in labor
- Beat the Air Force hazardous waste reduction goal by four years - achieving a 72.4 percent reduction in hazardous waste to date
- Reduced solid waste disposal by 60.6 percent, shattering the Air Force goal two years early

Hazardous Material Pharmacy. The HAZMART provides a single point for management of the distribution and use of all hazardous materials on base. Centralized control offers several advantages:

- It reduces waste by tailoring user requests to match actual needs
- It tracks total inventories and greatly reduces shelf life expiration problems
- It reduces the risks and costs of hazardous materials management
- It saves supply and disposal costs

The Hazardous Material Pharmacy matches the materials available to all base requesters and easily identifies recycling and reuse opportunities. Our Hazardous Materials Pharmacy provides quicker response for mission-essential materials while reducing hazardous material placed in functional organizations.

Aqueous-Based Parts Washers. Grand Forks AFB developed a comprehensive solvent management program that virtually eliminates solvent-based, hazardous waste generation, without cutting customer service. Our objective was to eliminate the need for expensive contracted solvent service, which generated more than 17,000 pounds of hazardous waste per year. This service also required government hazardous waste manifest management, which exposed the base to unnecessary liability. Initially, the base purchased four large aqueous-based parts cleaners. Aqueous cleaners use a non-hazardous detergent and hot water (applied under extreme pressure) to clean parts. The resulting wastewater is non-hazardous and can be safely discharged into a sanitary sewer.



Hazardous Waste Pickup from the DRMO Contractor.



HAZMART Pickup; packaging/picking up batteries for recycling.

Stenciling/Decals. We now use state of the art computer graphics and printing equipment, which greatly reduces the amount of detail painting on aircraft and support equipment. This system scans images and reproduces exact enlargements as a decal or stencil. This new process provides an exact copy at any dimension, and eliminates the need for detail painting. We currently operate these systems at structural maintenance and aerospace ground equipment mishaps. By eliminating the need to paint, we've also eliminated associated air emissions and the waste generated from paint gun cleaning. Worker exposure, previously associated with detail painting, is also eliminated.



Printers replace traditional stenciling techniques.

Paint Gun Cleaners. A specially formulated non-hazardous solvent eliminates the need to use lacquer thinner and mineral spirits to clean the base's paint guns, carburetor cleaners and brake washers. Its use produced a net reduction of more than eight tons of hazardous waste! This also greatly reduced the liability of hazardous waste manifesting errors as well as EPCRA reporting requirements for off-site releases. This program has been lauded by state regulators as the "right thing to do," and has positioned Grand Forks AFB to qualify for small quantity hazardous waste generator status.



These plastic beads helped the base eliminate 75 tons of lead-based paint last year.

Paint Removal Process Cuts Lead-based Paint Waste. The base uses "Blastox" blast media additive for non-recyclable paint removal. This product combines with the heavy metals in stripped paint to form a non-leaching solid that's both non-hazardous and undetectable in lab analyses. This additive prevented the generation of 75 tons of lead-based paint waste! The base converts 100 percent of the spent "Blastox" plastic blast media generated from its paint removal processes into bathroom fixtures. This eliminates the entire plastic blast media hazardous waste stream, which previously accounted for 10 percent of the base's hazardous waste stream. This also eliminates the liability of disposal and manifesting this hazardous waste.

Material Re-use

Hazardous Material Exchange Programs. The base has established two model programs to collect and reissue unwanted/excess hazardous materials in the base's housing and industrial areas.

■ **Housing.** Even though household wastes are exempt from hazardous waste regulation, the base "did the right thing" by establishing a household hazardous material exchange at the base Self-Help store. The exchange provides residents with a place to turn in their unwanted paints, pesticides, household cleaners and similar items. Other residents can then pick up and use these materials at no charge. Under this program, we reissue more than five tons of hazardous materials that otherwise would have been disposed in the local landfill. In addition, reissued items carry a label that not only identifies the item's contents, but includes a reminder to return any unused portion of the item to the Self-Help store for reissue.

'More than five tons of household hazardous waste and nearly 500 identified HAZMAT items are turned in for reissue through the base's housing and industrial HAZMAT Exchange Programs each year.'

**Environmental Flight Statistics
Grand Forks AFB, N.D.**

■ **Industrial.** The same option is also available to industrial customers. The HAZMART accepts unwanted and excess items, whether new or partially used, and puts them on the shelf for others to use, free of charge. These items are tracked in the Environmental Management System's hazardous materials database, so customers can easily see what's available and have access to required HAZCOM documentation. About 500 containers a year - items that would otherwise be disposed as hazardous waste - are redistributed in this manner.

Composting Program Saves \$17,000. The base composting program now includes curbside pickup of wastes in military family housing and a neighborhood drop-off composting site. More than 1,000 tons of compost is created from housing area waste products, while industrial area waste wood products provide another 850 tons of compost. Overall, this program saves the base \$17,000 per year in refuse tipping fees.

Land Farming Cuts Annual \$10,000 Soil Decontamination Bill. With state regulator permission, Grand Forks AFB has built a land farm for the on-site treatment of petroleum-contaminated soil. This facility treats contaminated soil taken from underground base storage tank excavations, oil/water separator maintenance and minor spills. This capability allows us to reclaim approximately 500 tons of contaminated soil per year, while saving us \$10,000 a year. Previously, this material had been contracted for disposal at special use landfills.

Surplus Homes. Since the 321st Missile Group's 1998 deactivation, the base has disposed of more than 120 surplus housing units. These units were still usable, so we decided to donate them to Native American reservations, where adequate housing is scarce. During FY98-99, 122 units were donated — saving 3,400 tons of waste from the landfill. Plans are underway to donate another 101 units under this program — saving another 2,800 tons from going to the landfill.



Composting household yard waste saves the base \$17,000 a year.

Recycling

Increased Number of Recycling Locations. During FY98-99, the base set up more recycling locations, bought recycling containers, conducted training and distributed information to increase recycling efforts. As a result:

- More than 3,500 recycling containers are now set up in work areas throughout the base
- On-base corrugated cardboard collection sites increased by approximately 35 percent



A contractor drops off a multiple-item recycling bin.

Materials Diverted from Waste Stream. In FY92, 146 tons was recycled. By FY99, 1,470 tons was recycled here; a greater than tenfold increase in recycled solid waste.

Closed Loop Recycling Projects. Several closed-loop-recycling projects have been implemented and more projects are under consideration. Base-sponsored closed loop-recycling projects include:

■ **Solvent Recycling.** Since aqueous systems do not work well in all cases, the base bought 18 solvent-based, parts-washer systems. These systems use self-contained filtration systems that allow the solvent to be used for up to one year before replacement. A simple filter replacement is performed about once per month. Instead of disposing of the spent

solvent as a hazardous waste, it is regenerated in a solvent distillation unit operated at the HAZMART. More than 95 percent of the spent solvent is recovered. The recovered solvent is then placed back into inventory and reissued by the base HAZMART. Since the solvent is a non-hazardous blend of hydrocarbons with extremely low air emissions, it greatly reduces potential harmful exposure to maintenance members and the environment.

■ **Hydraulic Fluid Recycling - Program ‘Pays for Itself in Under One Year.’** The base’s aircraft ground equipment shop reclaims about a ton of hydraulic fluid per year using a new recycling process. Recently purchased hydraulic fluid filtration equipment extends the life of hydraulic fluid indefinitely. Contaminated hydraulic fluid is pumped through a series of particle and moisture filters, which removes all detectable contamination. This process eliminates approximately 250 gallons of waste hydraulic fluid annually and saves the base about \$3,000 in related costs. Money saved using this system effectively paid for the program in under one year.

■ **Antifreeze Recycling - ‘\$40,000 Purchase Saves Base \$100,000 So Far.’** The base recently bought antifreeze recyclers for eight high-use shops. One hundred percent of the 173 tons of spent glycol antifreeze these shops generated has been recycled since 1998. The systems cost about \$40,000, but has saved more than \$100,000 in hazardous waste disposal costs so far.



The base bought antifreeze recyclers for eight high-use shops in 1998. This \$40,000 purchase has already saved the base \$100,000 in hazardous waste disposal costs.

■ **Used Oil Recycling.** The base sells between 1,200 to 1,500 gallons per year of used oil to a local contractor - a 10,000 pound hazardous waste generation cut that also saves the base about \$3,000 a year. This used oil is burned for energy recovery, making this a closed-loop process.

■ **Used Oil Filter Recycling.** The base recycled 16 tons of used oil and fuel filters in FY98-99. The recycling contractor uses a special process to remove the inner filter element and burn it for energy recovery. The metal filter housing is recycled. Since the filter elements are burned for energy recovery, the state of North Dakota has exempted our filters from being classified as a hazardous waste.

■ **HAZMART Drop-Off Program**

◆ **Dry-Cell Battery Recycling.** The HAZMART accepted more than 3,100 pounds per year of spent lithium, mercury and nickel-cadmium batteries for recycling. These batteries are treated as a universal waste, which avoids hazardous waste manifesting and reporting issues.

◆ **Fluorescent Light Tube Recycling.** More than 10,000 fluorescent light tubes are reclaimed here each year. Customers bring in spent tubes and place them in special cardboard receptacles. Recycling costs \$2,500 annually compared to an \$11,000 disposal cost as a hazardous waste. This generates an \$8,500 a year cost savings.

■ **Defense Reutilization & Marketing Office Recycling Center.** DRMO accepts the following items:

- | | | | |
|-------------|------------------|-----------------------|------------------------|
| ◆ Aluminum | ◆ Appliances | ◆ Bond paper | ◆ Brass |
| ◆ Cardboard | ◆ Computer paper | ◆ Copper wire & scrap | ◆ Electrical equipment |
| ◆ Furniture | ◆ Iron & steel | ◆ Lead-acid batteries | ◆ Photographic film |

- ◆ Metal bearings
- ◆ Radiators
- ◆ Tires
- ◆ Used oil/fuel
- ◆ Nylon
- ◆ Rubber scrap
- ◆ Titanium
- ◆ Wood

During FY98-99, the base's DRMO operation marketed about 684 tons of recyclables to DoD and federal agencies, private companies, Native American corporations, law enforcement agencies and charities. More than \$400,000 was raised by these sales. When the base's missile group deactivated in 1998, DRMO sold 30 armored vehicles to law enforcement agencies nationwide. DRMO also transferred 140 large wall lockers and other assorted furnishings, from base dormitories slated for demolition, to the North Dakota Army National Guard.

Base Tracks Construction and Demolition Debris Recycling. On average, we recycle about 25 tons of asphalt a year from road repairs and 30 tons of concrete from general repairs and demolition. In FY99, base civil engineers put specifications to recycle all concrete debris from a \$9.12 million contract bid to repair the base's runway. These specifications mean more than 51,000 cubic yards of concrete, about 104,000 tons, will be diverted from the landfill. Approximately \$2.6 million will be saved in refuse tipping fees by this action.

Responsible Disposal

Solid Waste Contract. For solid waste that cannot be recycled, the base contracts its disposal with a reputable, licensed service provider. Our solid waste goes only to landfills licensed by the state of North Dakota. The squadron's maintenance engineering flight manages the base-wide integrated solid waste and recycling contract. Flight quality assurance evaluators, review monthly reports from the contractor, perform no-notice inspections and audit contractor operations and management.

DRMO Hazardous Waste Contract. DRMO manages the regional hazardous waste contract that includes Grand Forks AFB. The contract is tailored to the base's specific requirements. DRMO monitors contractor activities and inspects contractor treatment, storage and disposal facilities to ensure compliance with all applicable DoD, local, state and federal regulations.

Recycled Content Goods & Materials Purchases

The base stocks more than 50 recycled content products in the base service store. These items include:

- copier & printer paper
- pens & pencils
- toner cartridges
- toilet paper
- re-refined oil



(Top left) Recycling fluorescent light tubes saves the base \$8,500 a year. (Lower left) Surplus dormitory furniture was transferred to the North Dakota Army National Guard. (Far right) Spent brass cartridges are collected for recycling.



Base hazardous waste that can't be recycled or reused is disposed of by a licensed private contractor.

Each year, approximately \$240,000 worth of the recycled content products are purchased by base members. These purchases included:

- 50 remanufactured printer toner cartridges per month swapped out with used ones
- Nearly 1,000 gallons of re-refined oil lubricates the base transportation fleet.
- Sold 100 tons of used tires per year for re-manufacturing; base only buys only recapped/retread tires (base vehicle fleet runs on approximately 1,000 retread tires)
- 400 tons of paper used on base each year are made from recycled material

Affirmative procurement specifications to buy recycled products have been added to new and existing contracts. These specifications require the use of recycled-content material in all construction and service contracts. All International Merchant Purchase Authorization Card holders receive initial and monthly training regarding these policies. Our base contracting flight audits each cardholder annually to ensure compliance. The Air Force Audit Agency commended our innovative Affirmative Procurement Program for effective implementation involving APP team formation, personnel training and annual program monitoring.

Community Benefits

Waste reduction and recycling activities positively affect the quality of life of the approximately 7,000 military and civilian members living and working at Grand Forks AFB and to the surrounding communities' 50,000 residents. Programs benefits received throughout the base in industrial shops, offices, military family housing, and the local community, such as those listed below:

- | | |
|--|---|
| ■ Newer, safer, less costly work processes | ■ Continuous support and training |
| ■ Cooperative effort | ■ Satisfactory return on investment |
| ■ Ease of use of the recycling process | ■ Weekly recycling and yard waste pick-up service |
| ■ Safer living environment/piece of mind | ■ New markets for environmentally-friendly items |
| ■ Reduced life-cycle costs of goods | ■ Longer life for the Grand Forks Regional Landfill |

Method & Measurement

At Grand Forks AFB, quantities of solid waste that are disposed of, recycled and composted are weighed and recorded by the solid waste and recycling contractor. The Civil Engineer's Maintenance Engineering Flight tracks these figures using several metrics. Certain recyclable materials and all hazardous wastes are weighed, recorded and tracked by DRMO. The factors used to determine achieved reductions include the costs of landfill disposal at a local disposal facility and costs avoided for disposal of refuse or hazardous wastes. Such calculations incorporate the costs of energy, labor, materials and capital. The environmental flight tracks these numbers with several metrics.

■ **Metrics.** Various metrics to track progress in hazardous waste disposal reduction, solid waste reduction and diversion and pesticide reduction are used. We also track the amount of solid waste collected, disposed and recycled. The amount and location of hazardous materials used on base is tracked in a computer database. Amounts of hazardous materials exchanged are tracked to see what sells and what doesn't. These numbers are used to identify trends, locate and fix problems and effectively allocate resources. *(Two examples of these metrics are shown below.)*

Hazardous Waste Reduction

60.6-percent reduction surpasses
Department of Defense Measure of Merit

Metric Key

- — Total Pounds
- — Air Force Incremental Goal
- — Air Force Final Goal

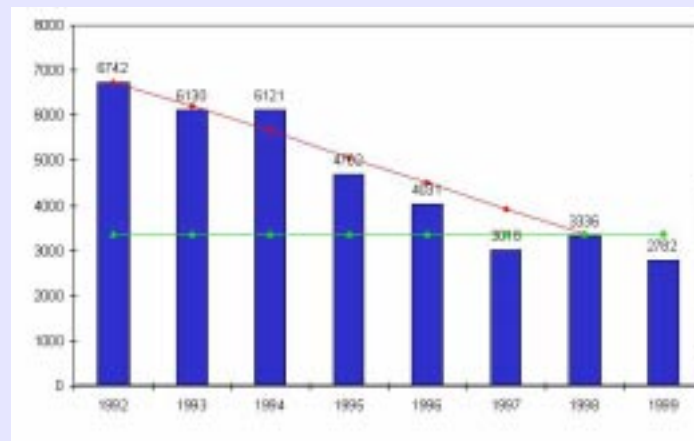


Solid Waste Reduction

72.4-percent reduction drop
previous year's total

Metric Key

- — Total Pounds
- — Air Force Incremental Goal
- — Air Force Final Goal



The 319th Civil Engineer Squadron's environmental flight uses metrics to track progress in key areas. The base's Hazardous Waste and Solid Waste Reduction Metrics are shown above.

■ **Environmental Compliance Assessment and Management Program.** This program measures the performance of our program against federal, state, local, DoD and Air Force standards. These assessments identify and track solutions to environmental problems. Assessments using internal assessment teams are performed annually. External assessments are performed every three years by Air Mobility Command. Results are tracked by the base EPC and AMC to ensure corrections are made.

Recognition

Grand Forks AFB's recycling programs serve more than 7,000 members across a 4,830-acre complex that supports a wide variety of aerial refueling, logistics, administrative, and personnel support facilities.

During FY98-99, Team Grand Forks captured the following environmental honors:

- *1998 White House Closing the Circle Certificate of Achievement* for contributing to “Greening the Government” and achievements in federal waste prevention, recycling, and affirmative procurement
- *1998 & 1999 Air Mobility Command Pollution Prevention Award, Non-Industrial Category*, won two years in a row and five of the last six years.
- *1999 Air Mobility Command Recycling Award Non-Industrial Category*
- *1999 Air Force General Thomas D. White Recycling Award Non-Industrial Category*
- *1999 Air Mobility Command Outstanding Civil Engineer Unit Award.*
- *1999 Air Mobility Command Commander-in-Chief’s Installation Excellence Award*

“Program accomplishments have been recognized through receipt of a wide array of federal, state, local, DoD, and Air Force awards. Our programs received a stunning 24 federal, state, DOD and Air Force awards since its inception in 1993.”

**Environmental Flight Statistics
Grand Forks AFB, N.D.**

Conclusion

Grand Forks Air Force Base has set the environmental management standard for Air Force excellence in waste reduction and recycling by implementing innovative, effective environmental programs. Forming effective partnerships with federal and state regulators, the base populace and community have accomplished these objectives.

The community of Grand Forks AFB has sought faster, better and more economical methods of reducing solid waste and has accepted the challenge of implementing innovative approaches when others have sometimes taken a more cautious approach. These determined methods have reaped significant rewards, as measured by our success in exceeding state and DoD recycling goals six years ahead of schedule and with enormous cost avoidance and savings.

We believe DoD installations have a unique opportunity to set an example for the nation in environmental quality — and that is what the men and women of Grand Forks AFB are doing, right here, right now!

